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aTD224 W2W37

nited States Department of Agriculture

Natural Resources Conservation Service

Washington Basin Outlook Report March 1, 1999



Basin Outlook Reports and Federal - State - Private Cooperative Snow Surveys

For more water supply and resource management information, contact:

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How forecasts are made

Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Measurements of snow water equivalent at selected manual snow courses and automated SNOTEL sites, along with precipitation, antecedent streamflow, and indices of the El Niño / Southern Oscillation are used in computerized statistical and simulation models to prepare runoff forecasts. These forecasts are coordinated between hydrologists in the Natural Resources Conservation Service and the National Weather Service. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

Forecasts of any kind, of course, are not perfect. Streamflow forecast uncertainty arises from three primary sources: (1) uncertain knowledge of future weather conditions, (2) uncertainty in the forecasting procedure, and (3) errors in the data. The forecast, therefore, must be interpreted not as a single value but rather as a range of values with specific probabilities of occurrence. The middle of the range is expressed by the 50% exceedance probability forecast, for which there is a 50% chance that the actual flow will be above, and a 50% chance that the actual flow will be below, this value. To describe the expected range around this 50% value, four other forecasts are provided, two smaller values (90% and 70% exceedance probability) and two larger values (30%, and 10% exceedance probability). For example, there is a 90% chance that the actual flow will be more than the 90% exceedance probability forecast. The others can be interpreted similarly.

The wider the spread among these values, the more uncertain the forecast. As the season progresses, forecasts become more accurate, primarily because a greater portion of the future weather conditions become known; this is reflected by a narrowing of the range around the 50% exceedance probability forecast. Users should take this uncertainty into consideration when making operational decisions by selecting forecasts corresponding to the level of risk they are willing to assume about the amount of water to be expected. If users anticipate receiving a lesser supply of water, or if they wish to increase their chances of having an adequate supply of water for their operations, they may want to base their decisions on the 90% or 70% exceedance probability forecasts, or something in between. On the other hand, if users are concerned about receiving too much water (for example, threat of flooding), they may want to base their decisions on the 30% or 10% exceedance probability forecasts, or something in between. Regardless of the forecast value users choose for operations, they should be prepared to deal with either more or less water. (Users should remember that even if the 90% exceedance probability forecast is used, there is still a 10% chance of receiving less than this amount.) By using the exceedance probability information, users can easily determine the chances of receiving more or less water.

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Washington Water Supply Outlook

March 1999

General Outlook

The snow continued to pile up throughout the month of February. All basins in Washington reported increases in snow-water-equivalent. There were 27 SNOTEL sites and four river basins that met or exceeded the previous maximum snowpack readings. Please turn to page five for a detailed listing of March 1 SNOTEL site maximum record snowpack. Monthly precipitation records were set at both Olympia and Quillayute for the month of February. Streamflow forecasts for this spring indicate a high potential for flooding on many streams and rivers.

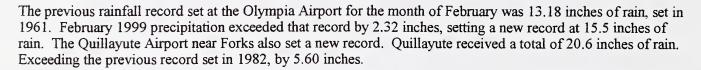
Snowpack

The March 1 statewide SNOTEL readings were much above normal at 176% of average. The Pend Oreille River Basin snow surveys, including Canadian data, reported the lowest readings at 123% of average. The Omak Creek Basin reported the highest snowpack readings at 276% of average. Westside averages from SNOTEL, combined with March 1 snow survey data, showed the North Puget Sound river basins with 170% of average, the Central Puget river basins with 158%, and the Olympic Peninsula basins with 233% of average. Snowpack along the east slopes of the Cascade Mountains included the Yakima area with 171% and the Wenatchee area with 159%. Snowpack in the Spokane River Basin was at 140% and the Lower Snake River Basin, had 146% of average. Maximum snow cover in Washington was at Paradise Park SNOTEL near Mount Rainer, with a water content of 83.3 inches. This site would normally have 47.9 inches of water content on March 1. Last year at this time Paradise Park had 58.3 inches of snow water equivalent. The highest average in the state was Moses Mountain SNOTEL in Okanogan County with 276% of average.

BASIN		PERCENT	OF	LAST	YEAR	PERCEN	T OF	AVERAGE
Spokane								
Newman Lake								
Pend Oreille								
Okanogan								
Methow			158				172	
Similkameen .			194				145	
Wenatchee			153				158	
Chelan			141				154	
Stemilt Creek	<		139				164	
Yakima			152				171	
Ahtanum Creel	٠		155				161	
Walla Walla .			197				157	
Lower Snake .			156				146	
Cowlitz			154				178	
Lewis								
White								
Green								
Puyallup								
Cedar								
Snoqualmie								
Skykomish								
Skagit								
Baker								
Nooksack								
Olympic Penir								
orambre tenti	ioura		200				233	

Precipitation

During the month of February, the National Weather Service and Natural Resources Conservation Service climate stations showed well above average precipitation for all river basins in Washington. The highest percent of average mountain precipitation in the state was at Thunder Basin SNOTEL in the North Cascade Mountains. Thunder Basin reported 376% of average for a total of 20.7 inches. The average for this site is 5.5 inches for February.



Basin averages for the water-year varied from 158% of average in the Olympic Peninsula river basins to 121% of average in the Walla Walla river basins. The highest individual site average for the water-year was 255% of average at Thunder Basin SNOTEL site in the North Cascade Mountains.

RIVER	FEBRUARY		WATER YEAR
BASIN	PERCENT OF AV	ERAGE	PERCENT OF AVERAGE
Spokane			130
Colville-Pend Oreille	201		135
Okanogan-Methow	270		150
Wenatchee-Chelan	205		151
Upper Yakima			147
Lower Yakima	200		149
Walla Walla	138		121
Lower Snake	188		128
Cowlitz-Lewis	214		153
White-Green-Puyallup			138
Central Puget Sound .	172		150
North Puget Sound	201	• • • • • • • • • • • • •	146
Olympic Peninsula	260		158

Reservoir

Most reservoir operators in Washington are beginning to prepare for a heavy runoff season by reducing current storage behind the dams. March and April snowpack accumulations will govern late winter releases in anticipation of spring runoff. Reservoir storage in the Yakima Basin was 463,500 acre feet, or 83% of average for the upper reaches and 133,000 acre feet, 95% of average for Rimrock and Bumping Lakes. Storage at the Okanogan reservoirs was 139% of average for March 1. The power generation reservoirs included the following: Coeur d'Alene Lake, 163,500 acre feet, or 110% of average and 69% of capacity; Chelan Lake, 249,300 acre feet, 148% of average and 37% of capacity; and Ross Lake at 218% of average and 48% of capacity.

BASIN	PERCENT	OF CAP	ACITY	PERCENT OF	? AVERAGE
Spokane		. 69 . N/A . 83 . 37 . 56 .			110 N/A 139 148 83 95 86
North Puget Sound		. 48 .	• • • • • • • • • • • •	• • • • • • • • •	518

Streamflow

March 1 forecasts indicate above normal summer flows for all streams in the state. They vary from 212% of average for the Colville River at Kettle Falls to 113% of average for the Priest River near Priest River, ID. March forecasts for some Western Washington streams include: Cedar River near Cedar Falls, 133%; Green River, 115%; and the Skagit River, 135%. Some Eastern Washington streams include the Yakima River near Parker, 140%; the Wenatchee River at Peshastin, 140%; and the Spokane River near Post Falls, 136%. Volumetric forecasts are developed using current, historic, and average snowpack and precipitation and streamflow data collected and coordinated by organizations cooperating with NRCS.

Streamflows reported for February varied from well above to well below average. The South Fork Walla Walla River near Milton Freewater had the highest flows with 172% of average. The Similkameen River at Nighthawk with only 46% of average, had the lowest in the state. Other streamflows were the following percentage of average: the Priest River, 129%; the Columbia at the International Boundary, 114%; the Spokane at Spokane, 94%; the Columbia below Rock Island Dam, 107%; the Cle Elum River near Roslyn, 72%; and the Snake River below Ice Harbor Dam, 118%.

BASIN

Skagit at Concrete

PERCENT OF AVERAGE

MOST PROBABLE FORECAST

(50 PERCENT CHANCE OF EXCEEDENCE)

88

		(50 LERCI	TA T	CIMICE	OL	EACEE	ا جا ۱۳۲۰ اجار
Col Oka Wen Upp Low Wal Low Cow Whi	kane ville-Pend Oreille nogan-Methow atchee-Chelan er Yakima er Yakima la Walla er Snake litz-Lewis te-Green-Puyallup tral Puget Sound th Puget Sound mpic Peninsula				113 126 137 128 128 128 135 115 115	3-212 3-162 5-149 7-141 5-140 3-183 9-138 5-186 5-117	
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Lew:	is at Ariel					129 90	

For more information contact your local Natural Resources Conservation Service office.

BASIN SUMMARY OF SNOW COURSE DATA

MARCH 1999

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									5110	2/24/99	118	39.9		
	HUMBOLDT GLCH PILLOW	4250	3/01/99		18.5	8.5	12.8	SKOOKUM CREEK PILI	OW 3920	3/01/99		40.9	22.9	24.9

BASIN SUMMARY OF SNOW COURSE DATA

MARCH 1999

W0W	COURSE ELEVAT	ION	DATE SN	OW WA	CONTENT	YEAR	ERAGE 1961-90	SNOW COURSE		VATION	DATE	SNOW DEPTH	WATER CONTENT	last Year	AVERAGE 1961-90
	SLIDE ROCK MOUNTAIN	7100	3/01/99		17.72	9.5			PILLOW	5530	3/01/99		48.5	22.9	27.8
	SPENCER MOW PILLOW	3400	3/01/99		61.9	38.9	27.2	TRAPPING CK LOW	W CAN.	2850	2/28/99	20	5.9	3.9	5.0
	SPIRIT LAKE PILLOW	3100	3/01/99		29.52	6.6	6.6	TRAPPING CK UP	CAN.	4100	2/27/99	30	9.8	7.2	7.9
,	SPOTTED BEAR MIN.	7000	3/01/99		13.9E	7.5	13.3	TRINKUS LAKE		6100	2/22/99	112	39.9	25.8	36.7
	STAHL PEAK PILLOW	6030	3/01/99		37.6	25.7	30.2	TROUGH #2	PILLOW	5310	3/01/99	-3	13.81	13.5	9.0
	STAMPEDE PASS PILLOW	3860	3/01/99		55.1	35.6	38.2	TROUT CREEK	CAN.	5650	2/25/99	32	9.4	5.5	6.5
	STEMILT SLIDE	5000	2/26/99	64	21.9	16.9	12.7	TRUMAN CREEK		4060	2/22/99	18	4.6	2.8	5.0
	STEMPLE PASS	6600	2/25/99	43	12.0	5.0	8.5	TUNNEL AVENUE		2450	3/02/99	102	36.8	18.6	19.2
	STEVENS PASS PILLOW	4070	3/01/99		53.9	33.3	34.7	TV MOUNTAIN		6800	2/27/99	60	19.2	8.2	15.6
	STEVENS PASS SAND SD	3700	2/26/99	131	45.5	25.5	31.1	TWELVEMILE PILI	LOW	5600	3/01/99		22.0	13.3	16.4
	STORM LAKE	7780	2/24/99	45	13.2	9.1	10.8	TWIN CAMP		4100	3/02/99	72	22.3	16.2	21.8
	STRYKER BASIN	6180	2/26/99	99	32.1	22.0	28.5	TWIN CREEKS		3580	3/01/99		10.9E	5.5	10.7
	STUART MOUNTAIN	7400	2/27/99	100	34.8	19.8	27.4	TWIN LAKES PILI	LOW	6400	3/01/99		50.9	28.2	34.3
	SUMMERLAND RES CAN.	5050	2/23/99	35	9.9	6.1	8.4	TWIN SPIRIT DIV	VIDE	3480	2/27/99	62	19.5	13.1	13.8
	SUDMIT G.S.	4600	2/24/99	39	10.3	7.7	7.1	UPPER HOLLAND I	LAKE	6200	2/22/99	92	31.6	23.6	30.4
	SUNSET PILLOW	5540	3/01/99		24.5	13.6	25.7	UPPER WHEELER E	PILLOW	4400	3/01/99		18.7	12.4	12.1
	SURPRISE LKS PILLOW	4250	3/01/99		70.5	52.6	37.5	VASEUX CREEK	CAN.	4250	3/01/99	18	4.7	4.9	5.5
	TEN MILE LOWER	6600	2/23/99	24	5.6	3.6	6.3	WARM SPRINGS PI	LLLOW	7800	3/01/99		20.0	16.2	18.2
	TEN MILE MIDDLE	6800	2/23/99	33	8.0	6.0	9.5	WEASEL DIVIDE		5450	2/24/99	106	35.6	22.2	29.5
	THUNDER BASIN	4200	2/26/99	125	35.0E	15.8	18.5	WELLS CREEK E	PILLOW	4200	3/01/99	126	43.6	25.3	33.2
	TINKHAM CREEK PILLOW	3000	3/01/99		24.7	25.6	17.2	WHITE PASS ES F	PILLOW	4500	3/01/99		29.7	20.0	20.7
								WHITE ROCKS MYN	CAN.	7200	2/26/99	96	31.9	17.9	19.3

SNOTEL SITE SNOWPACK RECORDS MARCH 1, 1999

Washington had the highest reported snowpack in the Western United States on March 1. Statewide SNOTEL reported 176% of average snow-water-equivalent (SWE). Record maximum SWE was recorded at 27 SNOTEL sites, exceeding previous record snowpack years of 1990, 91, 95, 96, 97 and 98.

SNOTEL site name	March 1, 1999 SWE	Previous Record SWE / Year
Bumping Ridge Bunchgrass Meadows Elbow Lake Fish Lake Green Lake Grouse Camp June Lake Lone Pine Lost Horse Lyman Lake Morse Lake Morse Mountain Mount Crag Mount Gardner Olallie Meadows Park Creek Ridge Pope Ridge Potato Hill Quartz Peak	48.0 41.1 61.2 51.4 34.9 30.7 69.6 70.4 32.0 77.6 78.1 32.0 65.1 26.0 76.2 65.4 38.6 44.4 30.7	40.8 / 1997 37.8 / 1997 48.0 / 1997 45.0 / 1997 32.4 / 1997 24.1 / 1995 47.1 / 1997 47.7 / 1997 28.0 / 1997 74.9 /1991 71.4 / 1997 15.2 / 97 & 98 36.2 / 1997 24.8 / 1997 24.8 / 1997 27.0 / 1997 33.3 / 1997 30.4 / 1997
Rainy Pass Rex River Sasse Ridge Sheep Canyon Skookum Creek Spencer Meadows Surprise Lakes Wells Creek	53.2 41.1 52.9 68.1 40.5 62.0 70.2 43.2	51.3 / 91 & 96 35.9 / 1997 49.7 / 1997 60.5 / 1990 31.9 / 1997 42.0 / 1997 59.2 / 1997 36.5 / 1997



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Helpful Internet Addresses

NRCS Snow Survey and Climate Services Homepages

Washington:

http://www.wa.nrcs.usda.gov/nrcs/CoopSnoSrvy.htm

Oregon:

chris.bieker@wa.usda.gov

http://crystal.or.nrcs.usda.gov/snowsurveys

Idaho:

http://idsnow.id.nrcs.usda.gov

National Water and Climate Center (NWCC):

http://www.wcc.nrcs.usda.gov

NWCC Anonymous FTP Server: ftp.wcc.nrcs.usda.gov

USDA-NRCS Agency Homepages

Washington:

http://www.wa.nrcs.usda.gov/nrcs

NRCS National:

http://www.ftw.nrcs.usda.gov



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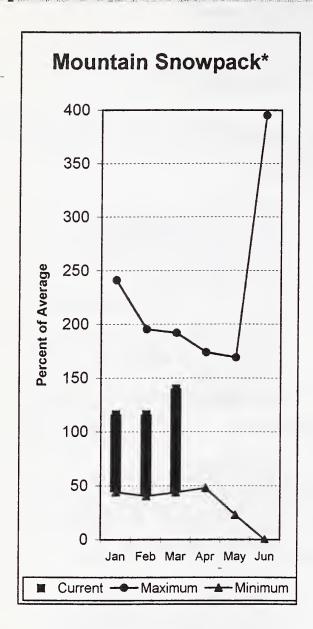
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kerry.perkins@wa.usda.gov

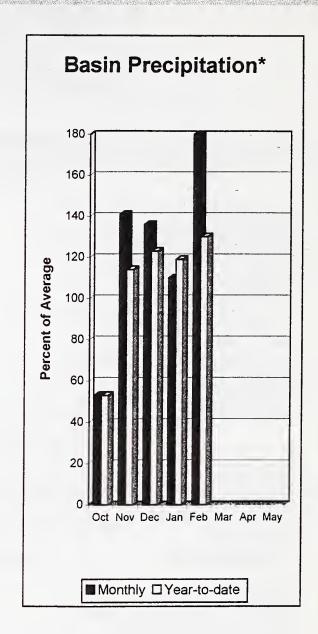
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Spokane River Basin





*Based on selected stations

The March 1 forecasts for summer runoff within the Spokane River Basin are 136% of average near Post Falls and 137% of average at Long Lake. The forecasts are based on a basin snowpack that is 140% of average and precipitation that is 130% of average for the water-year. Precipitation for February was above normal at 180% of average. Streamflow for the Spokane River at Long Lake, was 109% of average for February. March 1 storage in Coeur d'Alene Lake, was 163,500 acre feet, 110% of average and 69% of capacity. Snowpack at Quartz Peak SNOTEL site contained 30.5 inches of water, compared to the average March 1 reading of 18.6 inches. This beats the previous March 1 snowpack record of 30.4 inches, set in 1997. Average temperatures in the Spokane Basin were about 2 degrees above normal.

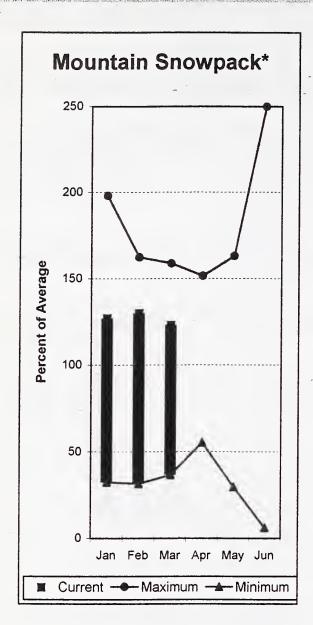
Spokane River Basin

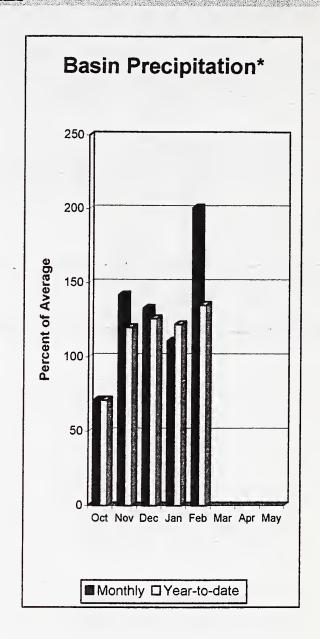
	*********					========		-		=======
	Stre	amflow	Foreca	asts -	- March	1, 199	99			
SPOKANE near Post Falls (2)	APR-SEP APR-JUL	3117 2998	3470 3344	 	3710 3580	136 136	!		1303 1162	2730 2633
SPOKANE at Long Lake	APR-JUL APR-SEP	3405 3697	3774 4080		4025 4340	137 137			1645 1983	2936 3159
SPOKAN Reservoir Storage (1	E RIVER BASIN .000 AF) - End	of Februa	ary			Watershed		E RIVER BAS:		1999
Reservoir	Usable Capacity 	*** Usab This Year	le Storaç Last Year	ge *** Avg	 Water:	shed		Number of Data Sites	This Yea	r as % of Average
COEUR D'ALENE	238.5	163.5	103.5	149.1	SPOKA	NE RIVER	.26225	16	169	140
					i I Newmai	n lake		2	168	177

^{* 90%, 70%, 30%,} and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

^{(1) -} The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

Colville - Pend Oreille River Basins





*Based on selected stations

The April - September forecast for the Kettle River streamflow is 128% of average; the Pend Oreille below Box Canyon, 116%; and the Priest River near the town of Priest River, 113% of average. February streamflow was 96% of average on the Pend Oreille River; 114% on the Columbia at the International Boundary; and 128% on the Kettle River. March 1 snow cover was 123% of average in the Pend Oreille Basin and 127% of average in the Kettle River Basin. Bunchgrass Meadows SNOTEL site set a new March 1 maximum snowpack record of 41.1 inches. The previous record of 37.8 inches was set in 1997. Average March 1 snowpack for Bunchgrass Meadows is 22.7 inches. Precipitation during February was 201% of average, bringing the year-to-date precipitation to 135% of average. Reservoir storage in Roosevelt and Banks lakes was not available at the time of this printing. Average temperatures were about 2 degrees above normal.

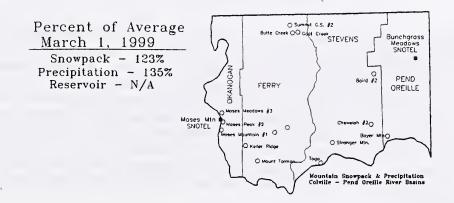


Colville - Pend Oreille River Basins

		<======= -	Drier =====	Future Co	onditions ==	===== Wetter	-===>>	
Forecast Point	Forecast							
	Period	90%	70%	50% (Most		30%	10%	30-Yr Avo
		(1000AF)	(1000AF)		(% AVG.)	(1000AF)	(1000AF)	
PEND OREILLE Lake Inflow (1,2)	APR-JUL	12225	14340	15300	116	16260	18375	13150
	APR-SEP	13337	15650	16700	116	17750	20063	14370
	APR-JUN	10298	12294	13200	116	14106	16102	11390
PRIEST nr Priest River (1,2)	APR-JUL	- 703	852	920	113	988	1137	814
	APR-SEP	749	908	980	113	1052	1211	868
PEND OREILLE bl Box Canyon (1,2)	APR-JUL	12783	14651	15500	116	16349	18217	13380
	APR-SEP	13935	15974	16900	116	17826	19865	14590
	APR-JUN	11063	12670	13400	116	14130	15737	11570
COLVILLE at Kettle Falls	APR-SEP	239	262	277	212	292	315	131
	APR-JUL	221	242	256	213	270	291	120
	APR-JUN	207	225	238	- 214 .	251	269	111
KETTLE near Laurier	APR-SEP	2064	2249	2375	128	2501	2670	1854
	APR-JUL	1980	2147	2260	128	2373	2540	1761
	APR-JUN	1784	1930	2030	128	2130	2276	1585
COLUMBIA at Birchbank (1,2)	APR-JUL	35770	39229	40800	116	42371	45830	35140
	APR-SEP	44601	48933	50900	116	52867	57199	43810
	APR-JUN	26160	28663	29800	116	30937	33440	25670
COLUMBIA at Grand Coulee Dm (1,2)	APR-SEP	66143	73197	76400	118	79603	86657	64850
	APR-JUL	55700	61614	64300	118 i	66986	72900	54543
	APR-JUN	43799	48407	50500	118	52593	57201	42756

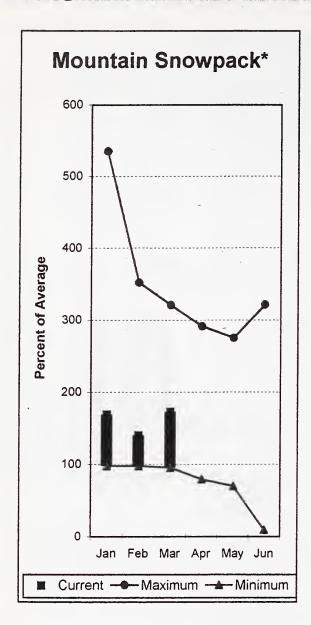
	Reservoir Storage (1000) AF) - End	of Februar	У		Watershed Snowpa	ck Analysis -	March 1,	1999
Resolir			*** Usabl This Year	e Storage Last Year	*** Avg	Watershed	Number of Data Sites	This Yea: Last Yr	r as % of Average
ROOSEVELT			NO REPORT	,	ı i	COLVILLE RIVER	0	0	0
BANKS	-		NO REPORT		!	PEND OREILLE RIVER	93	169	123
		÷				KETTLE RIVER	8	139	127

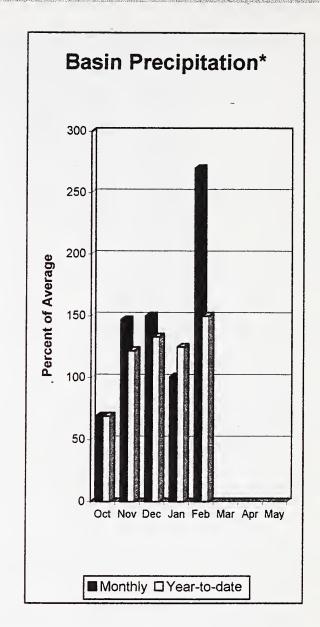
^{* 90%, 70%, 30%,} and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.



^{(1) -} The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

Okanogan - Methow River Basins





*Based on selected stations

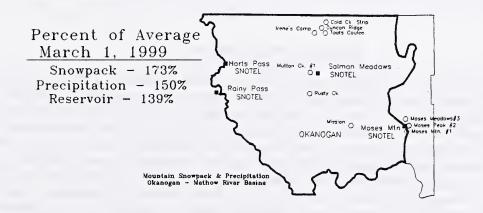
Summer runoff forecast for the Okanogan River is 144% of average; the Similkameen River, 143%; the Methow River, 160%; and Salmon Creek, 162% of average. March 1 snow cover on the Okanogan was 151% of average; the Methow, 172%; and the Similkameen River, 145%. Moses Mountain SNOTEL site had a March 1 reading of 32.3 inches or 276% of average, shattering the previous maximum record of 15.2 inches in 1997 and 1998. February precipitation in the Okanogan-Methow was an amazing 270% of average, with precipitation for the water-year at 150% of average. February streamflow for the Methow River was 91% of average; 134% for the Okanogan River; and 46% for the Similkameen. Snow-water-content at the Salmon Meadows SNOTEL, near Conconully, was 14.4 inches. Average for this site is 8.3 inches on March 1. Combined storage in the Conconully Reservoirs was 19,500 acre feet, which is 83% of capacity and 139% of the March 1 average. Temperatures were 5 degrees above normal for the past month.

Okanogan - Methow River Basins

		<<======	Drier ===	=== Future Co	onditions ====	=== Wetter ==	===>>	
Forecast Point	Forecast	=======		== Chance Of E	xceeding * ===			
	Period	90% (1000AF)	70% (1000AF)		Probable) (% AVG.)			30-Yr Avg (1000AF

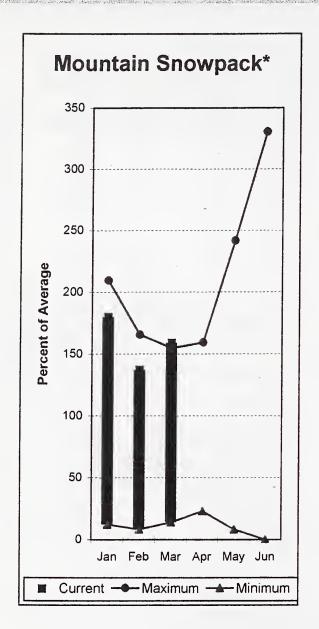
SIMILKAMEEN near Nighthawk (1)	APR-JUL APR-SEP	1521 1637	1758 1887	1865 2000	143 i 143 i		2209 2363	1304 1399
	APR-JUN	1289	1496	1590	143		2363 1891	1113
OKANOGAN near Tonasket (1)	APR-JUL	1447	1903	2110	144	2317	2773	1466
number total total	APR-SEP	1602	2103	2330	144		3058	1623
	APR-JUN	1228	1604	1775	144	1946	2322	1233
SALMON CREEK near Conconully	APR-JUL	18.1	26	31	162	36	44	19.1
1	APR-SEP	19.1	27	32	162	38	46	20
ÆTHOW RIVER near Pateros	APR-SEP	1372	1454	1510	160	1566	1648	942
	APR-JUL	1288	1364	1 -1415	162		1542	873
	APR-JUN	1089	1164	1 1215	163	1266	1341	746
	ETHOW RIVER BA	SINS		1	OKANOGAN ·	- METHOW RIVER	BASINS	
Reservoir Storage (:					Watershed Snown			
Reservoir	Usable Capacity		e Storage * Last	** Water		Number of		ar as % of
		Year	Year P	vg		Data Sites	Last Yr	Average
ALMON LAKE		NO REPORT			GAN RIVER	22	155	151
CONCONULLY RESERVOIR		NO REPORT		OMAK	CREEK	1	212	276
				SANPO	IL RIVER	0 ·	0	0
				SIMIL	KAMEEN RIVER	4	194	145
				TOATS	COULEE CREEK	1	183	120
				CONCO	NULLY LAKE	3	126	178

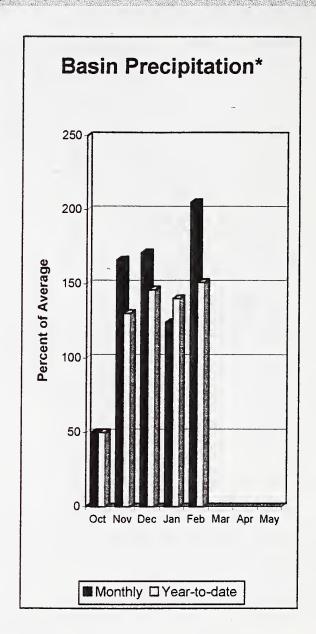
^{+ 90%, 70%, 30%,} and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.



^{(1) -} The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels: (2) - The value is natural flow - actual flow may be affected by upstream water management.

Wenatchee - Chelan River Basins





*Based on selected stations

Precipitation during February was 205% of average in the combined basin and 151% for the year-to-date. Runoff for the Entiat River is forecast to be 149% of average for the summer. The April-September forecast for the Chelan River is for 136% of average; it is 137% for the Wenatchee River at Plain; and for the Stehekin it is 137% of average. Icicle, Stemilt and Squilchuck creeks are all expected to be above average this summer. February streamflows on the Chelan River were 115% of average. The Wenatchee River averaged 80% of normal flows. March 1 snowpack in the Wenatchee Basin was 158% of average. The Chelan Basin was 154% of average; Colockum Ridge was 153%; and Stemilt Creek was 164% of average. Snowpack in the Entiat River Basin was 161% of average. Reservoir storage in Lake Chelan was 249,300 acre feet, or 148% of March 1 average and 37% of capacity. Lyman Lake SNOTEL had the most snow water equivalent with 77.6 inches of water. This site would normally have 48.4 inches on March 1. Temperatures were 2-5 degrees above normal for February. Lyman Lake, Park Creek Ridge and Pope Ridge SNOTEL sites all set new March 1 snowpack records.

Wenatchee - Chelan River Basins

139

164

	Stre			s - March	ı 1, 1999			
					onditions ==		=====>> (
Forecast Point	Forecast Period	90% (1000AF)	70% (1000AF)	50% (Most (1000AF)	Probable) (% AVG.)	(1000AF)	10% (1000AF)	30-Yr Avg_ (1000AF)
CHELAN RIVER near Chelan	APR-SEP APR-JUL APR-JUN	1417 1263 990	1514 1345 1061	1580 1400 1110	136 137 137	1646 1455 1159	1743 1537 1230	1160 1024 812
STEHEKIN near STEHEKIN	APR-SEP APR-JUL APR-JUN	1021 874 663	1086 925 707	1130 1 960 1 737	137 137 137	1174 995 767	1239 1046 811	827 701 538
ENTIAT RIVER near Ardenvoir	APR-SEP APR-JUL APR-JUN	307 280 225	325 297 240	 338 308 250	149 150 148	351 319 260	369 336 275	227 206 169
WENATCHEE at Plain	APR-SEP APR-JUL APR-JUN	1470 1348 1098	1565 1421 1150	1630 1470 1185	137 137 137	1695 1519 1220	1790 1592 1272	1190 1072 864
WENATCHEE R. at Peshastin	APR-SEP APR-JUL APR-JUN	1757 1598 1299	2074 1885 1529	 2290 2080 1685	140 140 140	2506 2275 1841	2823 2562 2071	1636 1435 1204
STEMILT nr Wenatchee (miners in)	MAY-SEP	133	159	 177	128	195	221	138
ICICLE CREEK near Leavenworth	APR-SEP APR-JUL APR-JUN	398 371 290	419 390 313	 434 403 328	126 127 125	449 416 343	470 435 366	344 318 263
WENATCHEE - Cl Reservoir Storage (100	HELAN RIVER E	BASINS		1	WENATCHE Watershed Sno	E - CHELAN RI wpack Analysi	VER BASINS	
Recoir	Usable Capacity		e Storage ** Last	'* Water		Number Of	This	======================================
	1	Year	Year Av	2	=============	Data Sit		

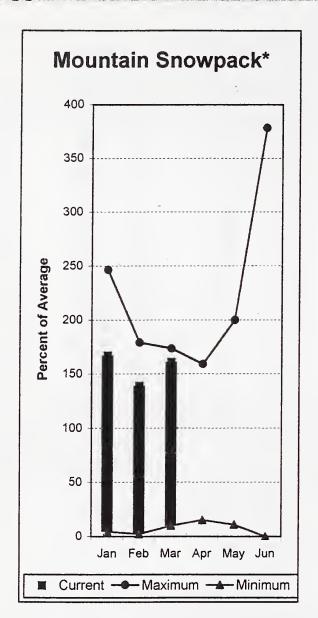
ENTIAT RIVER WENATCHEE RIVER SQUILCHUCK CREEK STEMILT CREEK

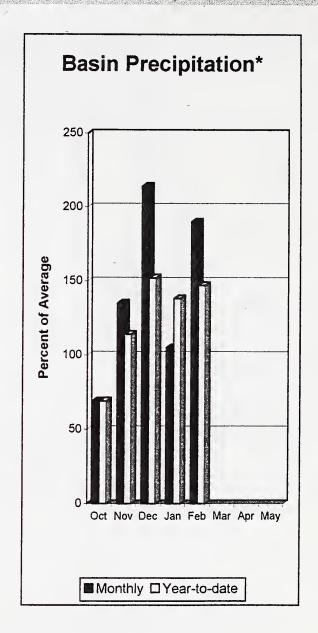
COLOCKUM CREEK

^{* 90%, 70%, 30%,} and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

⁽¹⁾ - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels. (2) - The value is natural flow - actual flow may be affected by upstream water management.

Upper Yakima River Basin





*Based on selected stations

March 1 reservoir storage for the Upper Yakima reservoirs was 463,500 acre feet, or 83% of average. Forecasts for the Yakima River at Cle Elum are for 137% of average. Lake inflows are all expected to be above average this summer. February streamflows within the basin were: the Yakima near Cle Elum 58% and the Cle Elum River near Roslyn at 72%. March 1 snowpack was 168% based upon 10 snow courses and SNOTEL readings within the Upper Yakima Basin. Fish Lake, Grouse Camp, Olallie Meadows and Sasse Ridge SNOTEL sites all set new record snowpack maximums for March 1 readings. Precipitation was 190% of average for February and 147% for the water-year-to-date. Volume forecasts for the Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow.

Upper Yakima River Basin

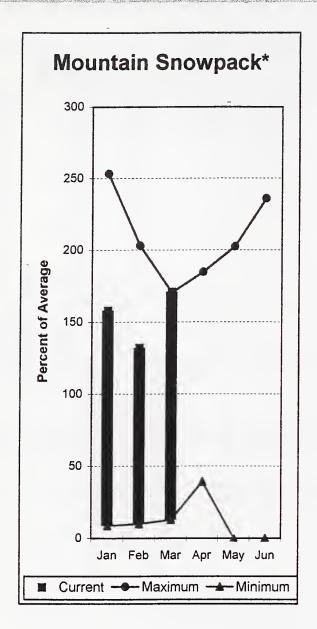
	Stre					ı 1, 1999			
		<<======	= Drier ==	vess	Future Co	onditions ===	==== Wetter	====×>>	
Forecast Point	.Forecast	• ========		=== Ch	ance Of E	xceeding * ==			
	Period	90%	70%			Probable)	30%	10%	30-Yr Avg
	1	(1000AF)	(1000AF)	1		(% AVG.)		(1000AF)	(1000AF)
EECHELUS LAKE INFLOW	APR-JUL	157	169		177	143	185	197	124
	APR-SEP	166	180		190	141	200	214	135
	APR-JUN	141	150	1	156	143	162	171	109
		120	4.10	!	4.50	1		476	
ACHESS LAKE INFLOW	APR-JUL	138	149	!	157	141	165	176	111
	APR-SEP	144	156		164	139	172	184	118
	APR-JUN	125	134	!	140	141	146	156	99
LE ELUM LAKE INFLOW	APR-JUL	524	548		564	138	580	604	409
DE PROFIT DAKE THE DOM	APR-SEP	564	594	í	615	137 I.	636	666	448
	APR-JUN	439	461	1	475	138	489	511	345
	ALIC CON	400	301	1	3,0	150	403	511	340
AKIMA at Cle Elum	APR-JUN	918	964	i	995	138	1026	1072	721
	APR-JUL	1059	1113	i	1150	138	1187	1241	832
	APR-SEP	1147	1208	İ	1250	137	1292	1353	915
=======================================	.========		.======	 ======		`} :=========		4460000000	
UPPER Y Reservoir Storage		of Februar				Watershed Sno		is - March	
			Le Storage				Numbe		Year as % of
eservoir	Capacity		Last		Water	shed	of	=====	
~======================================		Year	Year	Avg			Data Si		,
CECHELUS	157.8			105.0	1	YAKIMA RIVER		165	168
ACHESS	239.0	164.7	176.3	179.0	1				
LE ELUM	436.9	218.0	333.9	273.0					

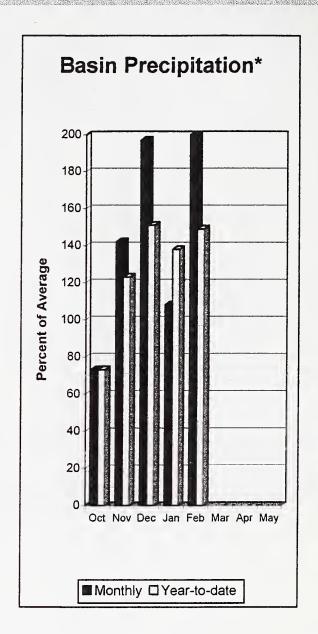
^{70%, 30%,} and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

^{(1) -} The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

Lower Yakima River Basin





*Based on selected stations

February streamflows within the basin were: the Yakima River near Parker, 75%; the Naches River near Naches, 65%; and the Yakima at Kiona, 89% of average. March 1 reservoir storage for the Bumping and Rimrock reservoirs was 133,000 acre feet, or 95% of average. Forecasts for the Yakima River at Parker are for 140% of average; American River near Nile, 128%; Ahtanum Creek, 128%; and the Klickitat River near Glenwood, 186%. March 1 snowpack was 174% based upon 8 snow courses and SNOTEL readings within the Lower Yakima Basin. New maximum snowpack records were set at Bumping Ridge, Green Lake, Lost Horse and Morse Lake SNOTEL sites. Precipitation was 200% of average for February and 149% for the water-year-to-date. Volume forecasts for the Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow. Temperatures for the month were 2-5 degrees above normal.

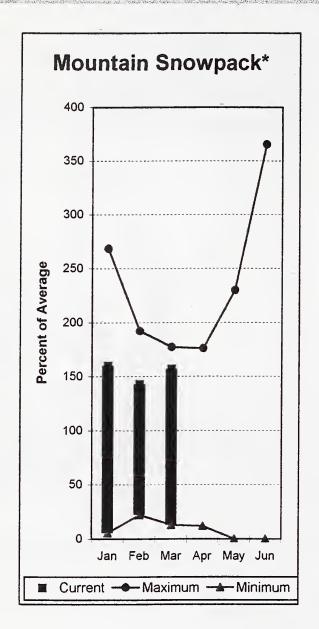
Lower Yakima River Basin

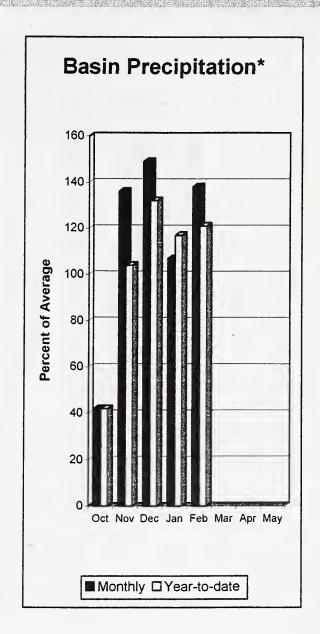
######################################								.===========
		<<===================================	= Drier ====	== Future Co	nditions ====	==== Wetter ===	==>>	
Forecast Point	Forecast Period	90% (1000AF)	70% - (1000AF)	50% (Most (1000AF)	Probable) (% AVG.)	(1000AF) (10	0% (00AF) (30-Yr Avg. (1000AF)
BUMPING LAKE INFLOW	APR-SEP APR-JUL APR-JUN	157 143 117	171 156 129	180 164 137	132 132 132 132	189 172	203 185 157	136 124 104
`AMERICAN RIVER near Nile	APR-SEP APR-JUL APR-JUN	135 123 102	145 132 111	151 138 117	128 127 127	144	167 153 132	118 109 92
RIMROCK LAKE INFLOW	APR-SEP APR-JUL APR-JUN	264 225 181	285 241 195	300 252 205	126 126 127	263	336 279 229	238 200 162
NACHES near Naches	APR-SEP APR-JUL APR-JUN	1019 = 932 809	1091 996 865	1140 1 1040 1 903	137 138 139	1084 1	261 148 997	832 755 651
AHTANUM CREEK nr Tampico (2)	APR-SEP APR-JUL APR-JUN	41 38 32	52 47 40	59 54 46	128 128 128	66 60 52	77 70 60	46 42 36
YAKIMA near Parker	APR-SEP APR-JUL APR-JUN	2534 2314 2082	2693 2452 2195	2800 2545 2272	140 141 142	2638 2	066 776 462	1994 1805 1597
KLICKITAT near Glenwood	APR-JUN APR-SEP	182 231	195 i 248 i	203 260	185		224 289	110 140
LOWER YAK. Reservoir Storage (1)	IMA RIVER BASI 000 AF) - End	N of Februar	У	1	LOWER Watershed Snow	YAKIMA RIVER BA pack Analysis -	SIN March 1	, 1999
Reservoir		*** Usab1	e Storage ** Last Year Av	** Water		Number of Data Sites	This Y	ear as fof
BUMPING LAKE	33.7			2				
RIMROCK	198.0			0.0				

^{* 90%, 70%, 30%,} and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

^{(1) -} The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

Walla Walla River Basin





*Based on selected stations

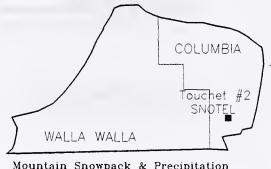
February precipitation was 138% of average, bringing the year-to-date precipitation to 121% of average. March 1 snowpack was at 157% of average. The forecast is for 128% of average streamflow in the South Fork Walla Walla River and 183% for Mill Creek, during the coming summer. February streamflow was 172% of average for the Walla Walla River. The Touchet SNOTEL site had 48.5 inches of snow-water-equivalent. The average March 1 reading for this site is 27.8 inches. Average temperatures were about 4 degrees above normal for the area.

Walla Walla River Basin

			Drian	- Futuro C	onditions	===== Wetter ==		
Forecast Point	Forecast Period		70% (1000AF)	Chance Of 50% (Most		30%	1	30-Yr Avg. (1000AF)
MILL CREEK at Walla Walla	APR-SEP APR-JUL APR-JUN	24 24 23	28 28 28 28	31 31 30	183 183 182	34 34 34 33	39 38 38-	17.1 16.9 16.7
F WALLA WALLA near Milton-Freewater	APR-JUL APR-SEP	60 73	66 80	70 84	132	74 89	80 96	53 66
WALLA WALLA Reservoir Storage (1000		**	у			A WALLA RIVER F wpack Analysis		1999
eservoir	Usable Capacity 		e Storage ** Last Year Avo	Wate:	rshed	Number of Data Sites		ar as % of Average
				WALL	A WALLA RIVER	2	197	157

^{* 90%, 70%, 30%,} and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.



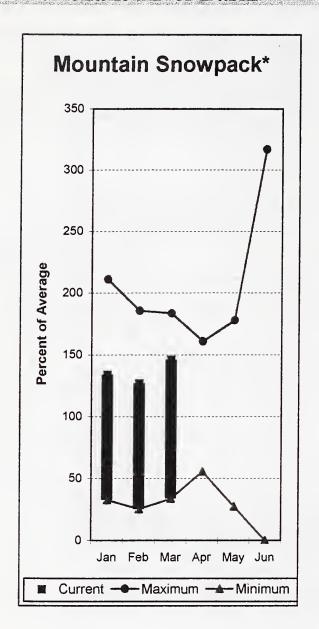
Mountain Snowpack & Precipitation Walla Walla River Basin

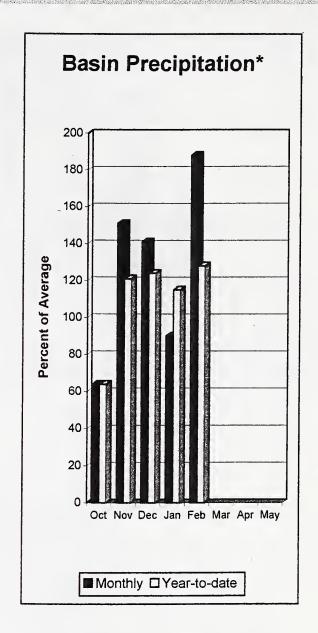
Percent of Average March 1, 1999

Snowpack - 157% Precipitation - 153%

^{(1) -} The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

Lower Snake River Basin





*Based on selected stations

The April - September forecast is for 130% of average streamflow in the Snake River below Lower Granite Dam; the Grande Ronde at Troy, 138%; and the Clearwater River at Spalding, 129%. February precipitation was 188% of average, bringing the year-to-date precipitation to 128% of average. March 1 snowpack was at 146% of average. February streamflow was 96% of average for the Clearwater River; 101% for the Snake River below Lower Granite Dam; and 106% for the Grande Ronde River near Troy. Average temperatures were about 1 degree above normal for the area.

Lower Snake River Basin

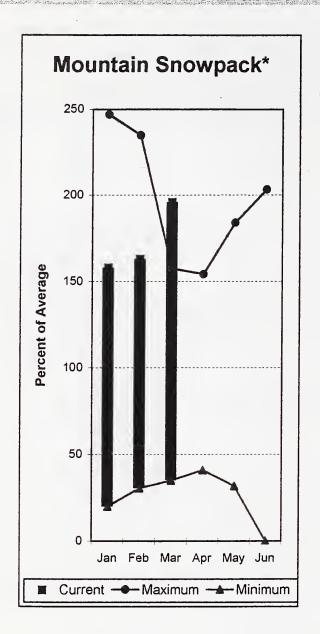
	_				onditions ==			
Forecast Point	Forecast Period	90% (1000AF)	70% (1000AF)	50% (Most	Exceeding * = Probable) (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg (1000AF)
GRANDE RONDE at Troy (1)	MAR-JUL APR-SEP	1580 1411	1883 1685	2020 1810	137 138	2157 1935	2460 2209	1471 1312
CLEARWATER at Spalding (1,2)	APR-JUL APR-SEP	7417 7856	9070 9606	9820 10400	129 129	10570 11194	12223 12944	7618 8052
SNAKE blw Lower Granite Dam (1,2)	APR-JUL APR-SEP	20930 23431	25929 29049	28200 31600	130	30471 _34151	35470 39769	21650 24360
LOWER SNAK Reservoir Storage (100	E RIVER BASI 0 AF) - End		у	!	LOW Watershed Sno	ER SNAKE RIVE Dwpack Analys		., 1999
Reservoir	Usable Capacity		e Storage *** Last Year Avo	Water	shed	Numbe of Data Si	======	ear as % of r Average
		:=======	*****	LOWER	SNAKE, GRANI	DE RONDE 15	156	146

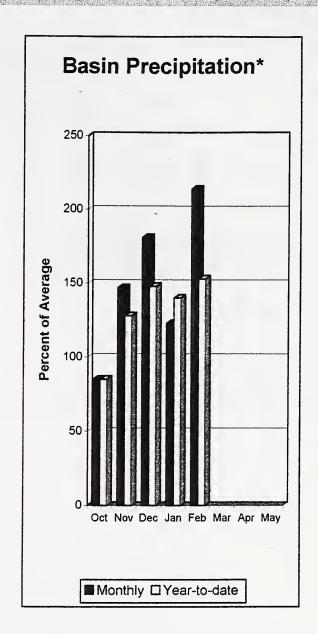
^{* 90%, 70%, 30%,} and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

^{(1) ~} The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels. (2) ~ The value is natural flow ~ actual flow may be affected by upstream water management.

Cowlitz - Lewis River Basins





*Based on selected stations

The forecast for summer runoff in the Lewis River Basin is 139% of average. The forecast for the Cowlitz River at Castle Rock is for 135%, and the Klickitat River near Glenwood is 186% of average runoff. February streamflow for the Cowlitz River was 90% of average and 129% for the Lewis River. February precipitation was 214% of average, 153% of average for the water-year. March 1 snow cover for the Cowlitz River was 178%, and the Lewis River was 213% of average. Average snowpack for the combined Cowlitz - Lewis river basins was 196% of average, exceeding the previous maximum by 39%. The Paradise Park SNOTEL recorded the most water content for the basin with 83.3 inches of water. This is the second highest snowpack reading since the site was installed in 1981. Record high for Paradise Park is 86.6 inches, recorded in 1997. Average March 1 water content is 47.9 inches. Six SNOTEL sites in the basin set new maximum snowpack records for March 1. Average temperatures were near normal during February.

Cowlitz - Lewis River Basins

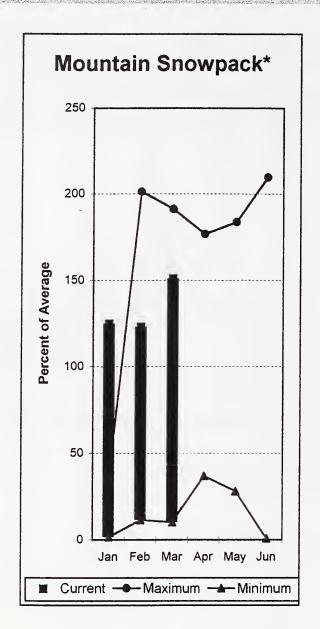
	Stre	eamflow	Forecast	s - Marcl	n 1, 1999			
Forecast Point	Forecast	İ				===== Wetter ===	i	
	Period	90% (1000AF)	70% (1000AF)	50% (Most (1000AF)	Probable) (% AVG.)	30%	10% _ 000AF)	30-Ýr Avg. (1000AF)
LEWIS at Ariel (2)	APR-JUL APR-SEP APR-JUN	1191 1389 1041	1360 1562 1201	1475 1680 1310	140 139 140	1590 1798	1759 1971 1579	1053 1206 935
COWLITZ R. bl Mayfield Dam (2)	APR-SEP APR-JUL APR-JUN	2003 1762 1511	2424 2130 1826	2710 2380 2040	138 138 138	2630	3417 2998 2569	1970 1731 1477
COWLITZ R. at Castle Rock (2)	APR-SEP APR-JUL APR-JUN	2677 2336 2015	3233 2821 2432	3610 3150 2715	135 136 136	3479	4543 3964 3415	2667 2325 1995
KLICKITAT near Glenwood	APR-JUN APR-SEP	182 231	195 248	203 260	185 186	211 272	224 289	110 140
COWLITZ - LE Reservoir Storage (10	WIS RIVER BAS		у	 		Z - LEWIS RIVER P Dwpack Analysis -		, 1999
Reservoir	Usable Capacity		e Storage ** Last	* Water	shed	Number of		ear as % of
	i	Year	Year Av	g		Data Sites	Last Yr	r Average
		-45 - 5k = 20 3 5		LEWIS	RIVER	4	158	213
				COWL	TZ RIVER	7	154	178

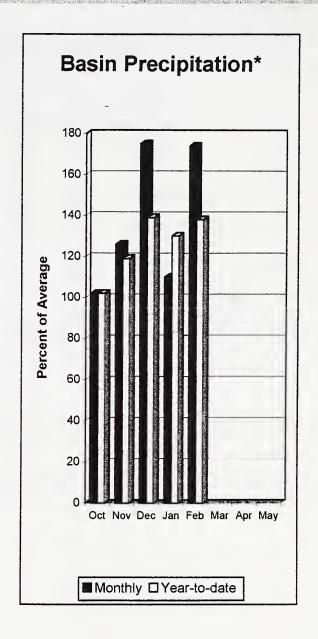
^{* 90%, 70%, 30%,} and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

rage is computed for the 1961-1990 base period.

^{(1) -} The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

White - Green River Basins





*Based on selected stations

Summer runoff is forecast to be 115% of average for the Green River and 117% of average for the White River near Buckley. March 1 snowpack was 164% of average in the White and Puyallup river basins; and 124% in the Green River Basin. Water content on March 1 at the Corral Pass SNOTEL, at an elevation of 6,000 feet, was 42.9 inches. This site has a March 1 average of 27.6 inches. February precipitation was 174% of average, bringing the water-year-to-date to 138% of average for the basins. Average temperatures in the area were slightly below normal.

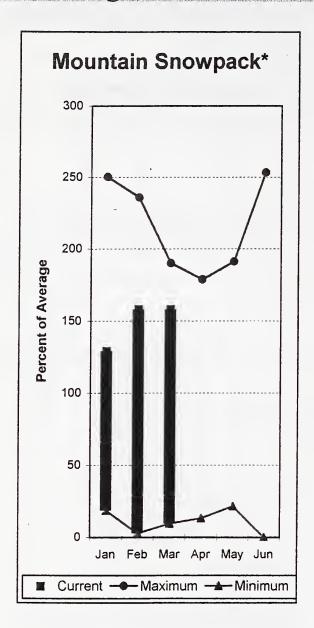
White - Green - Puyallup River Basins

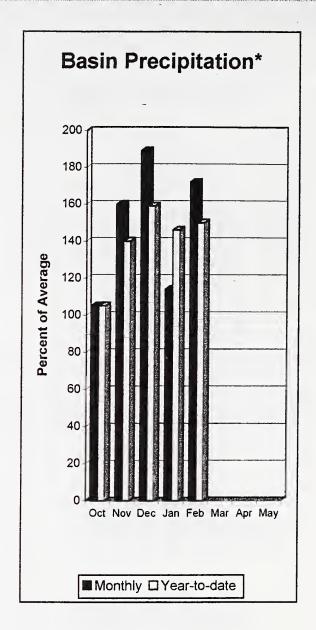
	Stre	amflow	Forecas	ts -	March	n 1, 1999			
Forecast Point	Forecast Period	90%	70%	== Cha 50	ance Of 1 0% (Most	Exceeding * = Probable)		10%	30-Yr Avg.
WHITE near Buckley (1,2)	APR-JUL	(1000AF) 	(1000AF) 	= ====	(1000AF) ====================================	(* AVG.) ====== 117	(1000AF) (1	L000AF) 	(1000AF)
	APR-SEP	526	602		636	117	670	746	542
GREEN below Howard Hanson (1,2)	APR-JUL APR-SEP APR-JUN	222 249 203	273 303 249	 	296 328 270	115 115 115	319 353 291	370 407 337	257 285 234
WHITE - GREEN - Reservoir Storage (10			У				EEN - PUYALLUP R owpack Analysis		
Reservoir	Usable Capacity	*** Usabl This Year	Le Storage Last Year	*** Avg	Water	rshed	Number of Data Sites	=====	ear as % of r Average
				 	WHITE	RIVER	3	130	164
					GREEN	N RIVER	7	142	124
					PUYAI	LUP RIVER	3	130	164

 $[\]star$ 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

^{(1) -} The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

Central Puget Sound River Basins





*Based on selected stations

Forecast for spring and summer flows are 133% for the Cedar River near Cedar Falls; 139% for the Rex River; 119% for the South Fork of the Tolt River; and 137% for the Cedar River at Cedar Falls. Basin-wide precipitation for February was 172% of average, bringing water-year-to-date to 150% of average. March 1 snow cover in the Cedar River Basin was 178%; the Tolt River Basin was 150%; the Snoqualmie River Basin was 157%; and the Skykomish River Basin was 148% of average. New maximum snowpack records were set at the Mount Gardner, the Rex and the Skookum Creek SNOTEL sites. Previous records for these sites were all set 1997. Stevens Pass SNOTEL, at 4,070 feet, had 53.9 inches of water content. Average March 1 water content is 34.7 inches. February temperatures were slightly below normal.

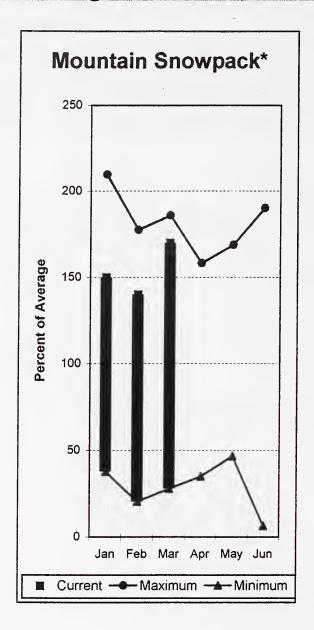
Central Puget Sound River Basins

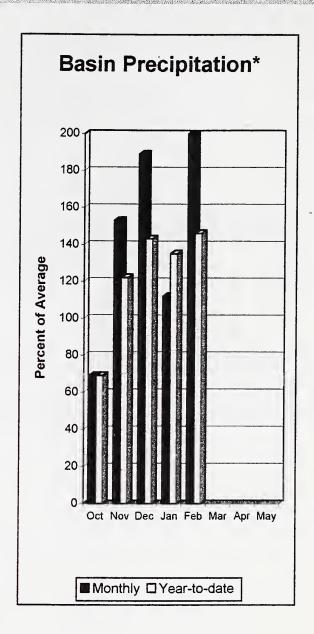
	261	======================================	rorecast	s - Marci	h 1, 1999	-6-4		
Forecast Point	Forecast	i			onditions === Exceeding * ==		i	
	Period	- 90% (1000AF)		50% (Most		30% (1000AF)	10% I	30-Yr Avg (1000AF)
WHITE near Buckley (1,2)	APR-JUL APR-SEP	433 526	496 602	525 636	117 117	554 670	617 746	447 542
GREEN below Howard Hanson (1,2)	APR-JUL APR-SEP APR-JUN	222 249 203	273 303 249	296 328 270	115 115 115	319 353 291	370 407 337	257 285 234
WHITE - GREEN - Reservoir Storage (10			ту		WHITE - GRE Watershed Snow	EN - PUYALLUP wpack Analysi		-
			e Storage *		, ,	Number	This Ye	ear as % of
Reservoir	Capacity	This Year	Last Year A	Wate. rg	rsned	of Data Sit		
				WHIT	E RIVER	3	130	164
				GREE	N RIVER	7	142	124

^{* 90%, 70%, 30%,} and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

^{(1) -} The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels. (2) - The value is natural flow - actual flow may be affected by upstream water management.

North Puget Sound River Basins





*Based on selected stations

Forecast for the Skagit River streamflow is for 135% of average for the spring and summer period. February streamflow in the Skagit River was 88% of average. Other forecast points included the Baker River at 139%, and Thunder Creek at 127% of average. Basin-wide precipitation for February was 201% of average, bringing water-year-to-date to 146% of average. March 1 snow cover in the Skagit River Basin was 174%, the Baker River Basin was 169%, and the Nooksack River Basin was 167% of average. Rainy Pass SNOTEL, at 4,780 feet, had 53.2 inches of water content, beating the previous record set 1991 and 1996 by almost two inches. Average March 1 water content is 24.5 inches. Elbow Lake and Wells Creek SNOTEL sites also set new record snowpack levels for the Nooksack River Basin. March 1 Skagit River reservoir storage was 218% average and 48% of capacity. Average February temperatures were 2 degrees above normal for the basin.

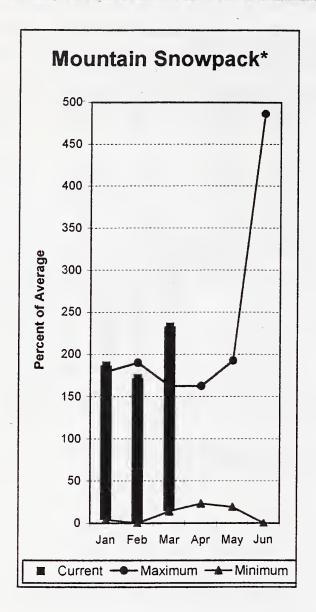
North Puget Sound River Basins

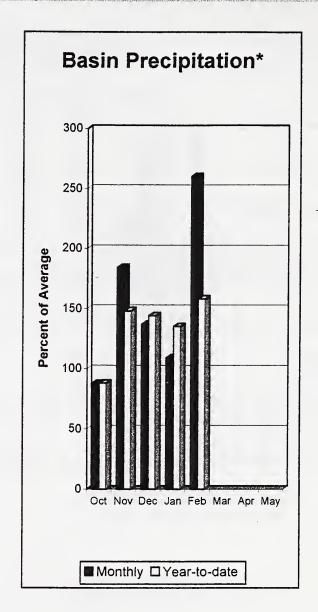
		========		=====		n 1, 1999			
		<<=====	= Drier =	****	Future Co	onditions ==	===== Wetter	====>>	
Forecast Point	Forecast								
	Period	90% (1000AF)	70% (1000AF		50% (Most (1000AF)	Probable) (% AVG.)	30% (1000AF)	10% ((1000AF)	30-Yr Avg (1000AF
HUNDER CREEK near Newhalem	APR-JUL	266	281	, !	(1000AF) 292	127	(1000AF)	318	230
TOTALER CREEK Hear NewHalem	APR-SEP	387	405	i	417	127	429	447	328
	APR-JUN	157	177	į	190	128	203	223	149
KAGIT at Newhalem (2)	APR-JUL	2345	2473	1	2560	136	2647	2775	1879
	APR-SEP	2724	2865	1	2960	135	3055	3196	2191
	APR-JUN	1812	1916		1986	137	2056	2160	1455
AKER RIVER near Concrete	APR-JUL	1040	1114		1165	139	1216	1290	836
	APR-SEP	1336	1423	1	1483	139	1543	1630	1064
	APR-JUN	754	811		850	139	889	946	611
NORTH PUGET	SOUND RIVER BA	SINS	.2500000	=====		NORTH E	PUGET SOUND RI	VER BASINS	
Reservoir Storage (1000 AF) - End	of Februar	У			Watershed Sr	nowpack Analys	is - March	1, 1999
	Usable	*** Usabl		e ***	1		Numbe	r This	Year as % o
eservoir	Capacity	This	Last		Water	rshed	of		*======
		Year	Year	Avg	 		Data Si	tes Last	Yr Averag
oss	1404.1	672.0	846.8	307.6	SKAGI	T RIVER	12	180	174
ABLO RESERVOIR		NO REPORT	,		BAKEF	RIVER	2	180	169
DRGE RESERVOIR		NO REPORT	1		I NOOKS	SACK RIVER	2	195	167

^{* 90%, 70%, 30%,} and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels. The value is natural flow - actual flow may be affected by upstream water management.

Olympic Peninsula River Basins





*Based on selected stations

March forecasts for summer runoff for streamflow in the Dungeness River Basin are 131% of average and 137% of average for the Elwha River. The Big Quilcene and Wynoochee rivers can expect much above average runoff this summer also. February precipitation was 260% of average. Precipitation has accumulated at 158% of average for the water-year. February precipitation at Quillayute was 26.2 inches. The thirty-year average for February is 12.01 inches. March 1 snow cover in the Olympic Basin was a record breaking 233% of average. The Mount Crag SNOTEL near Quilcene had 65.3 inches of snow-water-equivalent on March 1, shattering the previous record of 36.2 inches. Average for this site is 26.5 inches. The Hurricane snow course was measured to have 52.2 inches of water content and 151 inches of snow depth. The previous March 1 record water content, set in 1956 was 35.8 inches. Average March 1 water content at Hurricane is only 17.4 inches. Temperatures were 1 degree below average for the month.

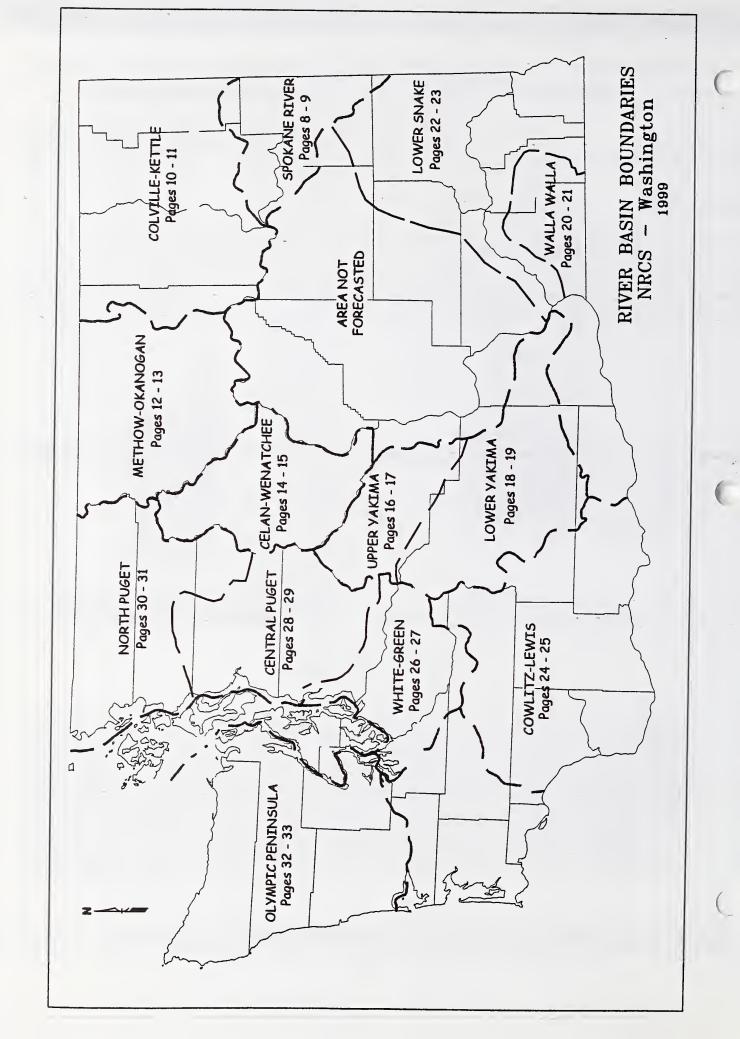
Olympic Peninsula River Basins

	Stre	amflow	Forecast	ts -	March	1, 1999				
Forecast Point			Drier ====					====>>	1	
Forecast Point	Forecast Period	90% (1000AF)	70% (1000AF)	1 50)% (Most I (1000AF)	<pre>kceeding * ==: Probable) (% AVG.) </pre>	30% (1000AF)	10% (1000AF)		30-Yr Avg (1000AF
DUNGENESS near Sequim	APR-SEP	183 150 108	193 158 116	 	200 163 122 ·	131 130 130	207 168 128	217 176 136		153 125 94
ELWHA near Port Angeles	APR-SEP APR-JUL	629 526	671 558	 	700 580	137 [*] 137	729 602	771 634		510 424
				1						
OLYMPIC P Reservoir Storage	=======================================	of Februar			··	OLYMPIC Natershed Snov		is - Marc	h 1,	
Reservoir Storage		of Februar	e Storage *	/vd	Waters	Vatershed Snow		is - Marc r Thi 	h 1,	1999 ar as % o
Reservoir Storage	(1000 AF) - End Usable	of Februar *** Usabl This	e Storage *	į	Waters	Vatershed Snow	wpack Analys Numbe of	is - Marc r Thi 	s Yea	ar as % o
Reservoir Storage	(1000 AF) - End Usable	of Februar *** Usabl This	e Storage *	į	Waters	Natershed Snow	wpack Analys Numbe of Data Si	is - Marc r Thi tes Las	s Yea	Ar as % o
Reservoir Storage	(1000 AF) - End Usable	of Februar *** Usabl This	e Storage *	į	Waters	Natershed Snow	wpack Analys Numbe of Data Si	is - Marc r Thi tes Las	sh 1, s Yea	Ar as % o
Reservoir Storage	(1000 AF) - End Usable	of Februar *** Usabl This	e Storage *	į	Waters OLYMPI ELWHA MORSE	Natershed Snow	wpack Analys Numbe of Data Si 1	is - Marc r Thi tes Las 185	ch 1, s Yea	Averac 211
	(1000 AF) - End Usable	of Februar *** Usabl This	e Storage *	į	Waters OLYMPI ELWHA MORSE DUNGEN	Shed C PENINSULA RIVER CREEK	wpack Analys Numbe of Data Si 1	is - Marc r Thi tes Las 185 254	ch 1,	Average 211 207 185

^{* 90%, 70%, 30%,} and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

erage is computed for the 1961-1990 base period.

⁽¹⁾ The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.



Pearlie S. Reed

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ural Resources Conservation Service

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Natural Resources Conservation Service Spokane, Washington

The Following Organizations Cooperate with the Natural Resources Conservation Service in Snow Survey Work*:

Canada Ministry of the Environment

Investigations Branch, Victoria, British Columbia

State Washington State Department of Ecology

Washington State Department of Natural Resources

Federal Department of the Army

Corps of Engineers U.S. Department of Agriculture

Forest Service

U.S. Department of Commerce

NOAA, National Weather Service

U.S. Department of Interior

Bonneville Power Administration

Bureau of Reclamation Geological Survey National Park Service Bureau of Indian Affairs

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Pacific Power and Light Company

Puget Sound Power and Light Company Washington Water Power Company

Snohomish County P.U.D.

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Yakama Indian Nation Whatcom County

Pierce County

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Newman Lake Homeowners Association

Whitestone Reclamation District



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Washington Basin Outlook Report

Natural Resources Conservation Service Mount Vernon, WA

